PATENT **MS131754.01/MSFTP282US**

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Date: September 28, 2007 /Jessica Sexton/
Jessica Sexton

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:			
Appellant(s):	D. Maxwell Chickering *et al.*	Examiner:	Akiba K. Robinson Boyce
Serial No:	09/681,050	Art Unit:	3639
Filing Date:	December 8, 2000		

Title: DECISION THEORETIC APPROACH TO TARGETED SOLICITATION BY MAXIMIZING EXPECTED PROFIT INCREASES

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellants submit this brief in connection with an appeal of the above-identified patent application. In filing this Appeal Brief, appellants' representative requests reinstatement of the Appeal originally filed with respect this case on August 16, 2006. As such, fees paid with respect to the Appeal filed on August 16, 2006 should be applied to the filing of this Appeal Brief. In the event any additional fees may be due in connection with this filing, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [MSFTP282US].

I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellants, appellants' legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-11 and 13-30 stand rejected by the Examiner. Claim 12 has been cancelled. The rejection of claims 1-11 and 13-30 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

No amendments were made to claims after the Final Office Action dated March 13, 2006.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))

A. Independent Claim 1

Independent claim 1 recites a computer-implemented method for soliciting a sub-population of a population, comprising: employing a computer-implemented component to identify the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model, the decision theoretic model constructed to maximize an expected increase in profits; setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; soliciting the sub-population identified to solicit; and setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.. (*See e.g.*, paragraph [0057], [0062], [0064], [0088])

B. Claim 10

Claim 10 recites the method of claim 1, wherein soliciting the sub-population identified comprises calling each of a plurality of members of the sub-population.. (*See e.g.*, paragraph [0091])

C. Independent Claim 11

Independent claim 11 recites a computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit to maximize an expected increase in profits, comprising: using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase; dividing the sample of the population into a non-solicitation group and a solicitation group; setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group; soliciting the solicitation group; setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase; utilizing a computer-implemented component to construct a decision tree as the decision theoretic model from the sample using a predetermined scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; and, applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits. (*See e.g.*, paragraph [0057], [0062], [0064], [0088], [0093])

D. Independent Claim 24

Independent claim 24 recites a computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit and a non-solicited sub-population to maximize an expected increase in profits, comprising: using a sample of the

population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase; utilizing a computer implemented module for constructing a decision tree as the decision theoretic model from the sample using a greedy approach and a marginal likelihood scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a last split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits; setting a solicitation variable to the first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and setting a purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase. (*See e.g.*, paragraph [0057], [0062], [0064], [0088], [0093])

E. Independent Claim 28

Independent claim 28 recites a computer implemented system for improving profits associated with advertising, comprising: a module that receives input regarding a population; (*See e.g.*, paragraph [0058]) a decision theoretic model that determines a subset of the population to solicit with the advertising and a non-solicited sub-population so as to maximize an expected increase in profits from the solicitation; (*See e.g.*, paragraph [0064] and [0088]) means for setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; (*See e.g.*, paragraph [0062]) and means for setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase. (*See e.g.*, paragraph [0062])

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Whether claims 1, 8-10 and 28 are unpatentable under 35 U.S.C. 102(e) as being anticipated by Bibelnieks *et al.* (U.S. 2003/0208402).

B. Whether claims 2-7, 11, 13-27, 29, 30 are unpatentable under 35 U.S.C. 103(a) over Bibelnieks *et al.* (U.S. 2003/0208402) in view of Kohavi (U.S. 6,182,058)

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1, 8-10 and 28 Under 35 U.S.C. §102(e)

Claims 1, 8-10 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Bibelnieks *et al.* (U.S. 2003/0208402). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Bibelnieks *et al.* does not teach or suggest each and every limitation of appellants' claimed invention.

> A single prior art reference anticipates a patent claim only if it expressly or inherently describes ***each and every limitation*** set forth in the patent claim. *Trintec Industries, Inc. v. Top-U.S.A. Corp.,* 295 F.3d 1292, 63 USPQ2d 1597 (Fed. Cir. 2002); *See Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ***The identical invention must be shown in as complete detail as is contained in the ... claim.*** *Richardson v. Suzuki Motor Co.,* 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). (emphasis added).

The subject invention relates to methods and systems for identifying a sub-population of a population to solicit and a sub-population of the population not to solicit that will maximize profits for an advertiser performing solicitation. For instance, appellants' claimed invention can take a sample of a population of potential purchasers, divide the sample into a solicitation group and a non-solicitation group, and solicit the solicitation group. Tracking of purchases and non-purchases by members of each group allows for a model to be constructed that can be used against the entire population to identify a sub-population to solicit and a sub-population not to solicit that will maximize profits. Appellants' claimed invention minimizes solicitation of members who will not make a purchase, who are already planning on buying, and/or who planned on buying but will not buy if solicited, thereby reducing cost of solicitation. The method also increases solicitation to a subset of members who will buy if solicited, thereby maximizing

purchases. In particular, as recited in independent claims 1 and 28, appellants' claimed invention ***sets a purchase variable to a first value for each of the plurality of members*** *of the solicitation and* ***the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members*** *of the solicitation and* ***the non-solicitation sub-populations that did not make the purchase***.

Bibelnieks *et al.* does not teach or suggest the aforementioned novel aspects of appellants' claimed invention. Rather, Bibelnieks *et al.* discloses a system that factors in the impact of multiple promotions to one or more classes of customers over a specified time. The cited reference attempts to improve direct marketing by determining the cannibalization impact one promotion has on another promotion for a given customer or customer class during this time. The system only tracks purchase information for customers who were sent solicitations. The system is silent regarding setting a purchase variable for non-solicited members of a sub population. Appellants' claimed invention tracks solicitation and purchase information for solicited and non-solicited members of a subpopulation, so that this information can be applied to the larger population in making solicitation decisions. The Advisory Action asserts that P0 represents a non-mailed promotion. Contrary to assertions in the Advisory Action, P0 represents a first promotion and P+1 represents a second promotion. The cited paragraph [0062] of the reference clearly states that both P0 and P+1 are promotions that are mailed to customers and the set of customer S represents customers that have received both promotions. The cited reference only tracks sales for individuals that were mailed promotions. It does not track purchases for individuals that were not sent promotions. The cannibalization matrix merely indicates the sales from mailed promotion P0 that were made by individuals that also received promotion P+1. The sales information is tracked only for individuals who received the promotions. It does not set any purchase variable for individuals who have not received a promotion. The subject claims disclose tracking purchases for non-solicited sub-populations which provides a benefit as discussed above in determining which customers to solicit. Therefore, Bibelnieks *et al.* does not teach or suggest setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase as in appellants' claimed invention.

In view of at least the foregoing, appellants' representative respectfully submits that Bibelnieks *et al.* fails to teach or suggest all limitations of appellants' invention as recited in independent claims 1 and 28 (and claims 8-10 that depends there from), and thus fails to anticipate the claimed invention. Accordingly, reversal of this rejection is respectfully requested.

B. Rejection of Claims 2-7, 11, 13-27, 29, 30 Under 35 U.S.C. §103(a)

Claims 2-7, 11, 13-27, 29, 30 are rejected under 35 U.S.C. 103(a) as unpatentable over Bibelnieks *et al.* (U.S. 2003/0208402) as applied to claim 1 above, and further in view of Kohavi (U.S. 6,182,058). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Bibelnieks *et al.* in view of Kohavi does not teach or suggest each and every limitation of appellants' claimed invention.

> To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on appellant's disclosure. *See In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Independent claims 11 and 24 (similarly to independent claims 1 and 28) recite ***setting the purchase variable to the first value for each of the plurality of members of the*** *solicitation and* ***the non-solicitation groups that made a purchase and to the second value for each of the plurality of members*** *of the solicitation and* ***the non-solicitation groups that did not make the purchase;… applying the decision tree against the population to identify the sub-population to solicit***. As discussed *supra* with respect to independent claims 1 and 28, Bibelnieks *et al* .fails to teach or suggest these novel features of the subject claims. Furthermore, Kohavi fails to make up for the deficiencies of Bibelnieks *et al.* with respect to these claimed features. Rather, Kohavi

discloses a hybrid classifier, called the NB-Tree classifier, for classifying a set of records. In an example, Kohavi teaches a marketing campaign where responses are tracked to determine who is likely to respond. However, Kohavi fails to teach a solicitation variable that is set to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group. Kohavi does not indicate that unsolicited members are tracked and therefore would not need to set a solicitation variable. Furthermore, Kohavi also fails to teach a purchase variable that is set with a first value for purchase and a second value for non-purchase. A likeliness to respond is not analogous to a purchase. A recipient of the marketing campaign may respond, such as to request more information or look at a product, without ever making a purchase. Moreover, Kohavi fails to mention purchase or buy anywhere in the patent.

Therefore, Bibelnieks *et al.* and Kohavi do not teach or suggest setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;…and applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits as in appellants' claimed invention.

Claims 2-7 and 29-30 depend from independent claims 1 and 28 respectively. As discussed above with respect to the similar limitations of independent claims 11 and 24, Kohavi fails to cure the above noted deficiencies of Bibelnieks *et al.* regarding independent claims 1 and 28.

In view of at least the above, it is respectfully submitted that Bibelnieks *et al.* and Kohavi, alone or in combination, fail to teach or suggest all aspects of appellants' invention as recited in independent claims 1, 11, 24, and 29 (and claims 2-7, 13-23, and 25-27 that depend there from), and thus fails to make obvious the subject claimed invention. As such, reversal of this rejection is respectfully requested.

D. CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP282US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact appellants' undersigned representative at the telephone number below.

Respectfully submitted,

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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A computer-implemented method for soliciting a sub-population of a population, comprising:

employing a computer-implemented component to identify the sub-population to solicit and a non-solicited sub-population by using a computer-implemented decision theoretic model, the decision theoretic model constructed to maximize an expected increase in profits;

setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population;

soliciting the sub-population identified to solicit; and

setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-population that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

2. The method of claim 1, wherein using the computer-implemented decision theoretic model comprises using a decision tree, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on a solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation.

3. The method of claim 2, wherein the decision tree is constructed such that the split on the solicitation variable of each of the plurality of paths is a last split.

4. The method of claim 2, wherein the decision tree is constructed such that the split on the solicitation variable of each of the plurality of paths is a first split.

5. The method of claim 2, wherein each of the plurality of leaf nodes provides a value for a probability conditional on at least a purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

6. The method of claim 2, wherein identifying the sub-population to solicit comprises computer-implemented acts of:

constructing the decision tree from a sample of the population using a predetermined scoring criterion, each of the plurality of leaf nodes of the tree providing a value for a probability conditional on at least a purchase variable; and,

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits.

7. The method of claim 6, wherein identifying the sub-population to solicit further initially comprises performing an experiment using a sample of the population to obtain values for the sample of the population for each of the solicitation variable and a purchase variable, the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

8. The method of claim 1, wherein soliciting the sub-population identified comprises mailing a solicitation to each of a plurality of members of the sub-population.

9. The method of claim 1, wherein soliciting the sub-population identified comprises e-mailing a solicitation to each of a plurality of members of the sub-population.

10. The method of claim 1, wherein soliciting the sub-population identified comprises calling each of a plurality of members of the sub-population.

11. A computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit to maximize an expected increase in profits, comprising:

using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase;

dividing the sample of the population into a non-solicitation group and a solicitation group;

setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group;

soliciting the solicitation group;

setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase;

utilizing a computer-implemented component to construct a decision tree as the decision theoretic model from the sample using a predetermined scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable; and,

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits.

12. (Cancelled)

13. The computer-implemented method of claim 11, wherein construction of the decision tree comprises using a greedy approach.

14. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a holdout criterion.

15. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a cross-validation holdout criterion.

16. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is a marginal likelihood criterion.

17. The computer-implemented method of claim 11, wherein the predetermined scoring criterion is an adjusted marginal likelihood criterion.

18. The computer-implemented method of claim 11, wherein the split on the solicitation variable of each of the plurality of paths is a last split.

19. The computer-implemented method of claim 18, wherein constructing the decision tree comprises: initializing the decision tree with an initial single leaf node as the root node;

using the greedy approach to construct the decision tree with no splits on the solicitation variable, the decision tree after construction using the greedy approach having a plurality of interim leaf nodes; and,

performing a split on the solicitation variable at each of the plurality of interim leaf nodes to generate the plurality of leaf nodes.

20. The computer-implemented method of claim 11, wherein the split on the solicitation variable of each of the plurality of paths is a first split at the root node.

21. The computer-implemented method of claim 20, wherein constructing the decision tree comprises:

initializing the decision tree with the first split at the root node on the solicitation variable; and,

using a greedy approach to finish constructing the decision tree.

22. The computer-implemented method of claim 11, further comprising soliciting the sub-population identified.

23. The computer-implemented method of claim 11, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

24. A computer-implemented method for constructing a decision theoretic model to identify a sub-population of a population to solicit and a non-solicited sub-population to maximize an expected increase in profits, comprising:

using a sample of the population to obtain values for the sample of the population for each of a solicitation variable and a purchase variable, the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation, and the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase;

utilizing a computer implemented module for constructing a decision tree as the decision theoretic model from the sample using a greedy approach and a marginal likelihood scoring criterion, the decision tree having a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a last split on the solicitation variable, and each of the plurality of leaf nodes providing a value for a probability conditional on at least the purchase variable;

applying the decision tree against the population to identify the sub-population to solicit to maximize the expected increase in profits;

setting a solicitation variable to the first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and

setting a purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

25. The computer-implemented method of claim 24 further comprising:

dividing the sample of the population into a non-solicitation group and a solicitation group;

setting the solicitation variable to the first value for each of a plurality of members of the solicitation group and to the second value for each of a plurality of members of the non-solicitation group;

soliciting the solicitation group; and,

setting the purchase variable to the first value for each of the plurality of members of the solicitation and the non-solicitation groups that made a purchase and to the second value for each of the plurality of members of the solicitation and the non-solicitation groups that did not make the purchase.

26. The method of claim 24, further comprising soliciting the sub-population identified by one of: calling each of a plurality of members of the sub-population, mailing a solicitation to each of the plurality of members of the sub-population, and e-mailing the solicitation to each of the plurality of members of the sub-population.

27. The computer-implemented method of claim 24, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

28. A computer implemented system for improving profits associated with advertising, comprising:

a module that receives input regarding a population;

a decision theoretic model that determines a subset of the population to solicit with the advertising and a non-solicited sub-population so as to maximize an expected increase in profits from the solicitation;

means for setting a solicitation variable to a first value for each of a plurality of members of the solicitation sub-population and to a second value for each of a plurality of members of the non-solicitation sub-population; and

means for setting a purchase variable to a first value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that made a purchase and to a second value for each of the plurality of members of the solicitation and the non-solicitation sub-populations that did not make the purchase.

29. The system of claim 28, wherein the decision theoretic model comprises a decision tree, the decision tree includes a plurality of paths from a root node to a plurality of leaf nodes, each of the plurality of paths having a split on the solicitation variable having a first value corresponding to solicitation and a second value corresponding to non-solicitation.

30. The system of claim 29, wherein each of the plurality of leaf nodes provides a value for a probability conditional on at least the purchase variable having a first value corresponding to purchase and a second value corresponding to non-purchase.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.